rfenkrantz
COMMERCIAL TESTING & ENGINEERING CO.
STRUMENTAL ANALYSIS DIV., 490 ORCHARD ST., GOLDEN, CO 80401

SINCE 1908

PAT NELSON
FREO AFFEN KRANTZ

OPTIONS
1) BIO MEDIATION — NO
2) CHEMICO ELIMINATE
VOLATILES
VIEW MONT
MILL PLANT
3) PLASTIC + BOAT HOUSE
BIO FIX BEADS

MIKE TOWNE
RICO DEVELOPMENT CORP.
#3 SODA STREET
RICO, CO 81332

CHARLES STEWART END AUG
OKOCITY

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
490 ORCHARD ST., GOLDEN, CO 80401
TELEPHONE: (303) 278-9521
FAX: (303) 278-1779

December 11, 1990

Wayne Webster
Rico Development Corporation
P. O. Box 130
Rico, CO 81332

Mr. Webster:

Enclosed is the report on biomonitoring of effluent sampled on November 26 through 30, 1990. As in the past, the effluent was toxic to Ceriodaphnia in both the acute and chronic bioassays, though not to Fathead minnows.

The forms required by Colorado and by the EPA are the following eight pages of this letter, and appear in Appendices A and B of the report.

An invoice for $1800 will be sent to P.O. Box 130 from Commercial Testing and Engineering headquarters in Illinois. The two species, five dilution acute test cost $650 and the two species, five dilution chronic test $1150.

I have sent a copy of the report to Mike Towne, plus copies of the forms for Colorado and the EPA.

I look forward to conducting the toxicity identification evaluation that Mike has requested I begin in January.

Best wishes for happy holidays.

Sincerely,

Fred Offenkrantz

Fred Offenkrantz

CDPS Effluent Biomonitoring Report

Permittee: Rico Development Corp. CDPS Permit No.: CO-0029793 Contact: Mike Towne

Address: #3 Soda Street, Rico, CO 81332 Discharge point: 002

Laboratory and person conducting test: Commercial Testing and Engineering, 490 Orchard St., Golden, CO 80401 Fred Offenkrantz

Sample type: Grab/Comp 11-26-90 Composite collected from: ____ AM/PM __/__/__ (date) to: ____ AM/PM __/__/__

Dilution water: Reconstituted Test species: Ceriodaphnia dubia age: <24 hours source: In-house

Test beginning date: 11-28-90 time: 1530 Ending date: 11-30-90 time: 1530

Test conc. & replicate	Number alive 0	24	48	72	96	Final #	Dissolved oxygen (mg/l) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	pH 0	24	48	72	96	T. alkalinity (mg/l) 0	24	48	72	96	T. hardness (mg/l) 0	24	48	72	96	Specific conductance 0	24	48	72	96
12% Effluent A	5	5	5			10	6.9	5.9	5.7			25.1	25.8	25.9			8.1	8.3	8.3			140					152					741				
B	↑	4	4			8		5.9	5.7				25.8	25.9				8.3	8.3																
C		4	4			8																												
D		5	5			10																												
6.25% A		5	5			10	6.9	5.9	5.7			25.1	25.8	25.9			7.9	8.3	8.3													429				
B		4	4			8																												
C		4	3			6		5.9	5.7				25.8	25.9				8.3	8.3																
D		3	3			6																												
12.5% A		4	4			8	6.9	5.9	5.7			25.1	25.8	25.9			8.0	8.3	8.3													823				
B		3	3			6																												
C		3	3			6																												
D		3	3			6		5.9	5.7				25.8	25.9				8.3	8.3																
25% A		3	2			5	6.9	5.9	5.7			25.1	25.8	25.9			8.0	8.3	8.3													825				
B		4	3			6		5.9	5.7				25.8	25.9				8.3	8.3																
C		2	2			4																												
D		3	2			5																												
50% A		3	2			5	6.9	5.9	5.7			25.1	25.8	25.9			8.0	8.3	8.3													990				
B		2	1			3																												
C		2	2			4		5.9	5.7				25.8	25.9				8.3	8.3																
D		2	2			4																												
100% A		1	0			0	6.9	5.9	5.6			25.1	25.8	25.9			7.7	8.2	8.2			85			800		1245								
B		0	0			0																												
C	↓	1	0			0		5.9	5.6				25.8	25.9				8.2	8.2																
D	5	0	0			0																												

LC = 46 % Test concentrations where statistically significant mortality occurred: 25, 46 and 100% effluent Statistical method: Fisher's Exact Test

Comments:

Colorado Department Health -

CDPS Effluent Biomonitoring ...

permittee : Rico Development Corp. CDPS Permit No. : CO-0029793 Contact : Mike Towne

address : #3 Scha Street, Rico, CO 81332 Discharge point : 002

laboratory and person conducting test : Commercial Testing and Engineering, 490 Orchard St., Golden, CO 80401 Fred Offenkrantz

sample type : Grab 0800 11-26-90 Composite collected from : ____ AM/PM __/__/__ (date) to : ____ AM/PM __/__/__

dilution water : Reconstituted Test species : Pimephales promelas age : 5 ± 1 source : In-house

test beginning date : 11-28-90 time : 1615 Ending date : 12-2-90 time : 1615

Test conc. replicate		Number alive					Final #	Dissolved oxygen (mg/l)					Temperature (C)					pH					T. alkalinity (mg/l)					T. hardness (mg/l)					Specific conductance				
		0	24	48	72	96		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0% Effluent	A	10	10	10	10	10	10	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.1	8.3	8.2	8.2	8.2	140					152					741				
	B	10	10	10	10	9	9		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.2	8.2															
25%	A	10	10	10	10	10	10	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	7.9	8.3	8.2	8.2	8.2											809				
	B	10	10	10	10	10	10		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.2	8.2															
2.5%	A	10	10	10	10	10	10	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.0	8.3	8.2	8.2	8.2											833				
	B	10	10	10	10	10	10		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.2	8.2															
5%	A	10	10	10	10	10	10	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.0	8.3	8.2	8.1	8.2											885				
	B	10	10	10	10	10	10		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.1	8.2															
10%	A	10	10	10	10	10	10	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.0	8.3	8.1	8.1	8.1											1190				
	B	10	10	10	10	10	10		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.1	8.1	8.1															
20%	A	10	10	10	10	10	10	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	7.7	8.2	8.0	8.0	8.0	85					900					1243				
	B	10	10	10	10	10	10		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.2	8.0	8.0	8.0															

IC = 46 % Test concentrations where statistically significant mortality occurred : None Statistical method : Fisher's Exact Test

Comments :

Colorado Department Health –

CDPS Effluent Biomonitoring Report - CHRONIC TOXICITY TEST

Permittee: Rico Development Corp. CDPS Permit No.: CO-0029793 Contact: Mike Towne

Address: #3 Soh Street, Rico, CO 81332 Discharge point: 002

Laboratory and person conducting test: Commercial Testing and Engineering, 490 Orchard Street Golden, CO 80401 Fred Offenhartz

Dilution water: Reconstituted location: ____ Test species: Ceriodaphnia dubia age: 16-24 hours source: In-house

Test beginning date: 11-28-90 time: 1700 Ending date: 12-5-90 time: 1750

Sample type: Grab

~~Composite~~ no. 1 collected from: 0800 AM/PM 11 26 90 (date) to: ____ AM/PM ___/___/___ days: 1

~~Composite~~ no. 2 collected from: 0830 AM/PM 11 29 90 to: ____ AM/PM ___/___/___ days: 3

~~Composite~~ no. 3 collected from: 0830 AM/PM 11 30 90 to: ____ AM/PM ___/___/___ days: 2

Test conc. & replicate	Percentage survival @ day 1	2	3	4	5	6	7	No. young produced X̄	min	max	Dry weight (mg) Repl.	X̄	D.O. min	max	Temp. min	max	pH X̄	R.D	Alk. X̄	i.D	Hard. X̄	i.D	Cond. X̄	R.D
0% effluent	100						→	16.8	14	20			6.1	6.9	24.1	25.9	8.3	0.0	140		152		741	
6.25%	100						→	17.7	15	20			6.1	6.9	24.1	25.9	8.3	0.2						
12.5%	100			→	30		→	16.3	15	19			6.1	6.9	24.4	25.9	8.3	0.0						
25%	100	80		→	60	60		3.7	3	4			6.1	6.9	24.4	25.9	8.3	0.0						
46%	100	80	70	→	10	0							6.1	6.9	24.4	25.9	8.3	0.0						
100%	100	40	20	→	0	0							6.1	6.9	24.4	25.9	8.05	0.1	85		800		1243	

IWC = 46 % Test concentrations where statistically significant effects occurred: 25, 46 and 100% effluent Statistical method: Dunnetts ANOVA.

Comments:

Colorado Department Health - WQCD

CDPS Effluent Biomonitoring Report - CHRONIC TOXICITY TEST

ermittee : Rico Development Corp. CDPS Permit No. : CO-0029793 Contact : Mike Towne
ddress : #3 Soda Street, Rico, CO 81332 Discharge point : 002
aboratory and person conducting test : Commercial Testing and Engineering, 490 Orchard St, Golden, CO 80401 Fred Offenhartz
ilution water : Reconstituted location : Test species : Pimephales promelas age : 5 days source : in-house
est beginning date : 11-28-90 time : 1800 Ending date : 12-5-90 time : 1800
ample type : Grab Composite no. 1 collected from : AM/PM / / (date) to : 0800 AM/PM 11 / 26 / 90 days : 3
Composite no. 2 collected from : AM/PM / / to : 0810 AM/PM 11 / 29 / 90 days : 3
Composite no. 3 collected from : AM/PM / / to : 0830 AM/PM 11 / 30 / 90 days : 2

Test conc. replicate	Percentage survival (@ day) 1	2	3	4	5	6	7	No. young produced X	min	max	Dry weight (mg) Repl.	X	D.O. min	D.O. max	Temp. min	Temp. max	pH X	pH S.D	Alk. X	Alk. i.D	Hard. X	Hard. i.D	Cond. X	Cond. S.D
Effluent	A 100						→				0.59		5.7	6.9	24.6	25.9	8.3	0.1	140		152		741	
	B 100						→				0.57													
	C 100						→				0.69	0.62												
25%	A 100						→				0.78		5.7	6.9	24.6	25.9	8.0	0.1						
	B 100						→				0.55													
	C 100						→				0.66	0.66												
2.5%	A 100						→				0.69		5.7	6.9	24.6	25.9	8.0	0.1						
	B 100						→				0.76													
	C 100	→ 90					→				0.60	0.71												
5%	A 100						→				0.49		5.7	6.9	24.6	25.9	8.0	0.2						
	B 100	100	90				→				0.71													
	C 100	100	90				→				0.84	0.73												
10%	A 100						→				0.48		5.7	6.9	24.6	25.9	7.9	0.2						
	B 100	100	100				→				0.71													
	C 100	100	100				→				0.85	0.68												
20%	A 100						→				0.94		5.7	6.9	24.6	25.9	7.9	0.1						
	B 100						→				0.77													
	C 100						→				0.46	0.72							85		800		1148	
																			85		800		1243	

VC= 46 % Test concentrations where statistically significant effects occurred : None Statistical method : Dunnett's ANOVA

omments :

Colorado Department Health - WQCD

REGION VIII GUIDANCE FOR ACUTE WHOLE EFFLUENT REPORTING

PERMITTEE NAME Rico Development Corp NPDES NO CO-0029793

50% MORTALITY TEST: ___ pass X fail LC50 21 % OUTFALL NO 002

TEST ANIMAL & AGE Ceriodaphnia dubia <24 hours SAMPLE TYPE, TIME & DATE Grab 0800 11-26-90

Analysis Time & Date: Begin 1530 11-26-90 End 1530 11-30-90

Measurements	Dilutions (% Effluent)* 0%	6%	12.5%	25%	~~46~~ 50%	75%	100%
No @ Start of Test	20	20	20	20	20	—	20
No live after 24 hrs	18	16	13	12	9	—	2
No live after 48 hrs	18	15	13	9	7	—	0
No live after 72 hrs							
No live after 96 hrs							
Initial DO: mg/l	6.9	6.9	6.9	6.9	6.9	—	6.9
DO; 24 hrs: old/new	5.9/6.9	5.9/6.9	5.9/6.9	5.9/6.9	5.9/6.9	"	5.9/6.9
DO; 48 hrs: old/new	5.7/	5.7/	5.7/	5.7/	5.7/	"	5.6/
DO; 72 hrs: old/new	/	/	/	/	/	/	/
DO; 96 hrs:							
Initial temp: °C	25.1	25.1	25.1	25.1	25.1	—	25.1
Temp; 24 hrs: old/new	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	"	25.8/25.1
Temp; 48 hrs: old/new	25.9/	25.9/	25.9/	25.9/	25.9/	"	25.9
Temp; 72 hrs: old/new	/	/	/	/	/	/	/
Temp; 96 hrs:							

Hardness: Receiving Water 152 Effluent 800 Recon. Water (if used) 152

Init. Total Residual Cl_2: 100% None Detected Init. pH: cntrl 8.1 100% 7.7

Init. NH_3 as N: 100% <0.1 Final NH_3 as N: 100% <0.1

Final pH: cntrl 8.3 100% 8.2 ANALYST'S NAME Fred Offenkantz

LABORATORY Commercial Testing and Engineering Golden, CO 80401 SIGNATURE/DATE Fred Offenkantz 12-11-90

* normally, a minimum of five plus control (0%) 10/5/89

REGION VIII GUIDANCE FOR ACUTE WHOLE EFFLUENT REPORTING

PERMITTEE NAME Rio Development Corp. NPDES NO CO-0029793

50% MORTALITY TEST: X pass ___ fail LC50 >100 % OUTFALL NO 002

TEST ANIMAL & AGE Pimephales 5 Days promelas SAMPLE TYPE, TIME & DATE Grab 0800 11-26-90

Analysis Time & Date: Begin 1615 11-28-90 End 1615 12-2-90

Measurements	Dilutions (% Effluent)* 0%	6%	12.5%	25%	46 ~~50~~%	75%	100%
No @ Start of Test	20	20	20	20	20	—	20
No live after 24 hrs	20	20	20	20	20	—	20
No live after 48 hrs	20	20	20	20	20	—	20
No live after 72 hrs	20	20	20	20	20	—	20
No live after 96 hrs	19	20	20	20	20	—	20
Initial DO: mg/l	6.9	6.9	6.9	6.9	6.9	—	6.9
DO; 24 hrs: old/new	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	7	6.9/5.7
DO; 48 hrs: old/new	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	7	6.9/5.7
DO; 72 hrs: old/new	6.9/5.6	6.9/5.6	6.9/5.6	6.9/5.6	6.9/5.6	7	6.9/5.6
DO; 96 hrs:	5.7	5.7	5.7	5.7	5.7	—	5.7
Initial temp: °C	25.1	25.1	25.1	25.1	25.1	—	25.1
Temp; 24 hrs: old/new	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	7	25.8/25.1
Temp; 48 hrs: old/new	25.9/25.1	25.9/25.1	25.9/25.1	25.9/25.1	25.9/25.1	7	25.9/25.1
Temp; 72 hrs: old/new	25.8/25.5	25.8/25.5	25.8/25.5	25.8/25.5	25.8/25.5	7	25.8/25.5
Temp; 96 hrs:	24.6	24.6	24.6	24.6	24.6	—	24.6

Hardness: Receiving Water 152 Effluent 800 Recon. Water (if used) 152

Init. Total Residual Cl_2: 100% None Detected Init. pH: cntrl 8.1 100% 7.7

Init. NH_3 as N: 100% <0.1 mg/L Final NH_3 as N: 100% <0.1

Final pH: cntrl 8.2 100% 8.0 ANALYST'S NAME Fred Offenkantz

LABORATORY Commercial Testing and Engineering Golden, CO 80401 SIGNATURE/DATE Fred Offenkantz 12-11-90

* normally, a minimum of five plus control (0%)

10/5/89

REGION VIII GUIDANCE FOR CHRONIC WHOLE EFFLUENT REPORTING
CERIODAPHNIA

PERMIT NAME Rico Development Corp. NPDES No CO-0029793

MEAN NO PRODUCED: CONTROL 16.8 EFFLUENT — pass ___ fail X Outfall No 002

Sample Type, Time, & Dates	Analyses: Time & Date
No 1 Grab, 0800, 11-26-90	Beginning 11-28-90 1700
No 2 Grab, 0830, 11-29-90	Ending 12-5-90 1750
No 3 Grab, 0830 11-30-90	Initial Organism Age 16-24 hours

Control = 0% Effluent Effluent Sample = 100% (6.25, 12.5, 25, 46 and Effluent (see Permit)

Receiving Water Hardness 152 Reconstituted Water Hardness (if used) 152

CERIODAPHNIA

Total Number of Young Produced in Three Broods ("D"=dead)

	Replicates											
Sample	A	B	C	D	E	F	G	H	I	J	K**	L**
Control	18	19	20	16	15	15	15	18	14	18		
46% Effluent	D	D	D	D	D	D	D	D	D	D		

PHYSICAL DATA - CONTROL

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1
T °C old/new	25.1	25.8/25.1	25.9/25.1	24.4/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9

PHYSICAL DATA - EFFLUENT (46%)

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1
T °C old/new	25.1	25.8/25.1	25.9/25.1	24.0/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9
Hardness*	800		798			806		

* Testing Required only on days when fresh effluent is received in laboratory (normally, initially, and days 3 and 5).

ANALYST'S NAME Fred Offenkrantz

LABORATORY Commercial Testing and Engineering Golden, CO 80401 SIGNATURE/DATE Fred Offenkrantz 12-11-90

10/5/89

REGION VIII GUIDANCE FOR CHRONIC WHOLE EFFLUENT REPORTING
FATHEAD MINNOWS

PERMIT NAME Rico Development Corp NPDES No CO-0079793

FINAL MEAN WEIGHT: CONTROL 0.67mg EFFL 0.72mg pass X fail ___ Outfall No 002

Sample Type, Time, & Dates	Analyses: Time & Date
No 1 Grab, 0800, 11-26-90	Beginning 1800 11-28-90
No 2 & 3 Grab, 0830, 11-29-90	Ending 1800 12-5-90
Grab, 0830, 11-30-90	Initial Organism: Age 5days Mean Weight ___

Control = 0% Effluent Effluent Sample = 0, 6.25, 12.5, 25, 46 and 100% Effluent (see Permit)

Receiving Water Hardness 152 Reconstituted Water Hardness (if used) 152

FATHEAD MINNOWS

	No of Organisms / Percent Survival Replicates				Mean Weight After 7 Days (milligrams) Replicates			
	A	B	C	D	A	B	C	D
Control	10/100	10/100	10/100		0.59	0.57	0.69	
46% Effluent	10/100	10/100	10/100		0.48	0.71	0.85	

PHYSICAL DATA - CONTROL

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7
T °C old/new	25.1	25.8/25.1	25.9/25.1	25.8/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9

PHYSICAL DATA - EFFLUENT (46%)

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7
T °C old/new	25.1	25.8/25.1	25.9/25.1	25.8/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9
Hardness*	800		798			806		

* Testing Required only on days when fresh effluent is received in laboratory (normally; initially, and days 3, and 5).

LABORATORY Commercial Testing and Engineering Golden CO 80401 ANALYST'S NAME Fred Offenkrantz

SIGNATURE/DATE Fred Offenkrantz 12-11-90

10/5/89

RICO DEVELOPMENT CORPORATION

WASTEWATER BIOMONITORING

Results of tests completed on December 5, 1990

Prepared for

Rico Development Corporation
P. O. Box 130
Rico, CO 81332

Prepared by

Fred Offenkrantz
Commercial Testing and Engineering
480 Orchard Street
Golden, CO 80401

December 11, 1990

SUMMARY

Samples collected from outfall 002 showed both acute and chronic toxicity to Ceriodaphnia, but none to Fathead minnows.

METHODS

A two species acute and a two species chronic bioassay were conducted with effluent from Rico Development Corporation's outfall 002. The initial sample was collected on November 26, 1990, delivered to Commercial Testing and Engineering (CTE) on November 26, and assigned CTE number 138491. Receiving water from the Dolores River, upstream of the discharge, was collected and received on the same dates. Subsequent samples were collected from the outfall on November 29 and 30 and delivered to CTE on November 30 and December 3, respectively.

All testing was conducted in accordance with the most recent protocols specified by Region VIII of the U.S. Environmental Protection Agency (USEPA, 1985 and 1989), outlined in Table 1.

Basic characteristics of the effluent were measured including pH, conductivity, dissolved oxygen, alkalinity, hardness, ammonia and residual free chlorine.

Alkalinity and hardness were determined by titrimetric methods specified by the American Public Health Association (1976). Dissolved oxygen was measured with a YSI model 54A oxygen meter and conductivity with a Jenway model PCM3 conductance meter.

The pH was measured using a Fisher Scientific model 910 pH meter and ammonia was measured using the same pH meter with an Orion model 95-12 ammonia-specific electrode. Total residual chlorine was measured using a LaMotte model STC-Cl colorimeter.

Both the acute and chronic tests consisted of exposing members of the Cladoceran species Ceriodaphnia dubia and Fathead minnow species Pimephales promelas to five concentrations of effluent. 100%, 46%, 25%, 12.5%, and 6.25% effluent dilutions were prepared using water reconstituted in the laboratory with hardness within 15% of the Dolores River's. Control replicates were exposed to 100% dilution water.

A 46% concentration was tested because that is the proportion, called the instream waste concentration, that the EPA estimates outfall 002 would contribute to the Dolores River during the lowest seven day average streamflow likely to occur in any ten year period.

Colorado law defines acute toxicity as a statistically significant difference, at the 95% confidence level, between mortality in the control and in any effluent concentration equal to or less than the instream waste concentration. Fisher's Exact Test was used to identify statistically significant differences.

An LC_{50} value for each species, the concentration of effluent that would be lethal to 50% of the individuals in an acute test, was calculated using the Binomial, Moving Average and Probit methods. Federal law defines acute toxicity as 50% or greater mortality in any effluent concentration.

Both federal and Colorado law define chronic toxicity as a statistically significant difference between the control and any effluent concentration in the rate of reproduction by Ceriodaphnia and of weight gain by Fatheads.

Chronic test data was analyzed using the Toxstat software written at the University of Wyoming Red Buttes Environmental Research Lab.

RESULTS

Water Chemistry

The waters' chemical characteristics appear in Table 3.

Toxicity Tests

Samples collected from outfall 002 showed both acute and chronic toxicity to *Ceriodaphnia*, but none to Fathead minnows, as shown in Tables 4 and 5. The EPA program calculated an LC_{50} value of 21% for the *Ceriodaphnia*, an estimate that 21% effluent would be lethal to exactly 50% of the test organisms during 48 hours.

DISCUSSION

A toxicity identification evaluation should be undertaken to determine the cause of the toxicity in outfall 002 wastewater.

REFERENCES

American Public Health Association, American Water Works Association and Water Pollution Control Federation. 1976. Standard Methods for the Examination of Water and Wastewater, 14th ed.. American Public Health Association, Washington, DC.

United States Environmental Protection Agency. 1985. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. EPA/600/4-85/013. Environmental Monitoring and Support Laboratory, Cincinnati, OH.

United States Environmental Protection Agency. 1988. Region VIII NPDES Whole Effluent Toxics Control Program. July 1 revision. USEPA Region VIII Water Management Division, Denver, CO.

United States Environmental Protection Agency. 1989. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA/600/4-89/001. Environmental Monitoring Systems Laboratory, Cincinnati, OH., 45268.

Table 1. EPA Region VIII Acute Test Conditions.

	Ceriodaphnia	Fathead Minnows
Sample preparation:	60 um Filtration	60 um Filtration
Test type:	Static Renewal	Static Renewal
Temperature:	25 +/- 1 °C	20 +/- 1 °C
Photoperiod:	16h light/ 8h dark	16h light/ 8h dark
Test Chamber size:	30 ml	600 ml
Test Sample vol.:	15 ml	150 ml
Renewal Period:	24 hours	24 hours
Age of Organisms:	<24 hours	5 +/- 2 days
Number per Chamber:	5	10
Replicate Chambers/Conc.:	4	3
Feeding Regime/Chamber:	None	0.1 ml brine shrimp at 0 and 48 hours
Test Duration:	48 hours	96 hours
Dilution Water:	Receiving Water	Receiving Water

Table 2. EPA Region VIII Chronic Test Conditions.

	Ceriodaphnia	Fathead Minnows
Sample preparation:	60 um Filtration	60 um Filtration
Test type:	Static Renewal	Static Renewal
Temperature:	25 +/- 1 °C	25 +/- 1 °C
Photoperiod:	16h light/ 8h dark	16h light/ 8h dark
Test Chamber size:	30 ml	600 ml
Test Sample vol.:	15 ml	150 ml
Renewal Period:	24 hours	24 hours
Age of Organisms:	<24 hours	≤ 7 days, born within 24 hours
Number per Chamber:	1	10
Replicate Chambers/ Conc.:	10	3
Feeding Regime/ Chamber:	0.1 ml Algae + 0.1 ml YCT/day	0.15 ml brine shrimp twice/day at 6 hour intervals
Test Duration:	Until 60% of control animals have 3 broods	7 days

Table 3. Initial Water Chemistry Measurements.

Parameter	Outfall 002	Dolores River
Ph (std. units)	7.7	
Alkalinity (mg/L CaCO3)	85	
Hardness (mg/L CaCO3)	800	152
Dissolved Oxygen (mg/L)	6.9	
Conductivity (us/cm)	1243	
Ammonia (mg/L as N)	<0.1	
Residual Chlorine (mg/L)	<0.1	

Table 4. Ceriodaphnia and Fathead Minnow Survival Data for Acute Toxicity Tests Completed 12-2-90.

	Number Exposed		Number Dead		Percent Mortality	
Conc. (%)	Cerio.	FHM	Cerio.	FHM	Cerio.	FHM
100	20	20	18	0	90.00	0.00
46	20	20	13	0	65.00	0.00
25	20	20	11	0	55.00	0.00
12.5	20	20	7	0	35.00	0.00
6.25	20	20	5	0	25.00	0.00
0	20	20	2	1	10.00	5.00

Table 5. Results of the Short-term Chronic Toxicity Tests Completed 12-5-90.

Exposure	Ceriodaphnia dubia		Pimephales promelas	
Effluent (%)	Mortality (%)	Neonates (mean)	Mortality (%)	Weight (mg)
0	0	16.8	0	0.62
6.25	0	17.7	0	0.66
12.5	10	16.3	3	0.71
25	40	3.7	7	0.73
46	100	-	0	0.68
100	100	-	0	0.72

APPENDIX A
Forms for reporting to the Colorado Department of Health
the results of toxicity tests completed 12-5-90 on sample 138491.

CDPS Effluent Biomonitoring Report - ACUTE TOXICITY TEST

Permittee: Rico Development Corp. CDPS Permit No.: CO-0029793 Contact: Mike Tonne

Address: #3 Soda Street, Rico, CO 81332 Discharge point: 002

Laboratory and person conducting test: Commercial Testing and Engineering, 490 Orchard St., Golden, CO 80401 Fred Offenkrantz

Sample type: Grab/0800/11-26-90 Composite collected from: ____ AM/PM ___/___/___ (date) to: ____ AM/PM ___/___/___

Dilution water: Reconstituted Test species: Ceriodaphnia dubia age: <24 hours source: In-house

Test beginning date: 11-28-90 time: 1530 Ending date: 11-30-90 time: 1530

Test conc. & replicate	Number alive 0	24	48	72	96	mean %	Dissolved oxygen (mg/l) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	pH 0	24	48	72	96	T. alkalinity (mg/l) 0	24	48	72	96	T. hardness (mg/l) 0	24	48	72	96	Specific conductance 0	24	48	72	96
0% effluent A	5	5	5			100	6.9	5.9	5.7			25.1	25.8	25.9			8.1	8.3	8.3			140					152					141				
B	↑	4	4			80		5.9	5.7				25.8	25.9				8.3	8.3																
C		4	4			80																												
D		5	5			100																												
6.25% A		5	5			100	6.9	5.9	5.7			25.1	25.8	25.9			7.9	8.3	8.3													809				
B		4	4			80																												
C		4	3			60		5.9	5.7				25.8	25.9				8.3	8.3																
D		3	3			60																												
12.5% A		4	4			80	6.9	5.9	5.7			25.1	25.8	25.9			8.0	8.3	8.3													823				
B		3	3			60																												
C		3	3			60																												
D		3	3			60		5.9	5.7				25.8	25.9				8.3	8.3																
25% A		3	2			40	6.9	5.9	5.7			25.1	25.8	25.9			8.0	8.3	8.3													885				
B		4	3			60		5.9	5.7				25.8	25.9				8.3	8.3																
C		2	2			40																												
D		3	2			40																												
46% A		3	2			40	6.9	5.9	5.7			25.1	25.8	25.9			8.0	8.3	8.3													990				
B		2	1			20																												
C		2	2			40		5.9	5.7				25.8	25.9				8.3	8.3																
D		2	2			40																												
100% A		1	0			0	6.9	5.9	5.6			25.1	25.8	25.9			7.7	8.2	8.2			85			800							1048				
B		0	0			0																												
C	↓	1	0			0																												
D	5	0	0			0		5.9	5.6				25.8	25.9				8.2	8.2																

WC = 46 % Test concentrations where statistically significant mortality occurred: 25, 46 and 100% effluent Statistical method: Fisher's Exact Test

Comments:

Colorado Department Health -

CDPS Effluent Biomonitoring Report – ACUTE TOXICITY TEST

Permittee: Rico Development Corp. CDPS Permit No.: Co-0029793 Contact: Mike Towne

Address: #3 Soda Street, Rico, CO 81332 Discharge point: 002

Laboratory and person conducting test: Commercial Testing and Engineering, 490 Orchard St., Golden, CO 80401 Fred Offenkrantz

Sample type: Grab 0800 11-26-90 Composite collected from: ____ AM/PM ___/___/___ (date) to: ____ AM/PM ___/___/___

Dilution water: Reconstituted Test species: Pimephales promelas age: 5 ± 1 source: In-house

Test beginning date: 11-28-90 time: 1615 Ending date: 12-2-90 time: 1615

Test conc. & replicate		Number alive 0	24	48	72	96	Final %	Dissolved oxygen (mg/l) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	pH 0	24	48	72	96	T. alkalinity (mg/l) 0	24	48	72	96	T. hardness (mg/l) 0	24	48	72	96	Specific conductance 0	24	48	72	96
0% effluent	A	10	10	10	10	10	100	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.1	8.3	8.2	8.2	8.2	140					152					741				
	B	10	10	10	10	9	90		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.2	8.2															
6.25%	A	10	10	10	10	10	100	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	7.9	8.3	8.2	8.2	8.2											809				
	B	10	10	10	10	10	100		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.2	8.2															
12.5%	A	10	10	10	10	10	100	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.0	8.3	8.2	8.2	8.2											823				
	B	10	10	10	10	10	100		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.2	8.2															
25%	A	10	10	10	10	10	100	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.0	8.3	8.2	8.1	8.2											885				
	B	10	10	10	10	10	100		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.2	8.1	8.2															
46%	A	10	10	10	10	10	100	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	8.0	8.3	8.1	8.1	8.1											990				
	B	10	10	10	10	10	100		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.3	8.1	8.1	8.1															
100%	A	10	10	10	10	10	100	6.9	5.7	5.7	5.6	5.7	25.1	25.8	25.9	25.8	24.6	7.7	8.2	8.0	8.0	8.0	85					800					1243				
	B	10	10	10	10	10	100		5.7	5.7	5.6	5.7		25.8	25.9	25.8	24.6		8.2	8.0	8.0	8.0															

IWC = 46 % Test concentrations where statistically significant mortality occurred: None Statistical method: Fishers Exact Test

Comments:

Colorado Department Health –

CDPS Effluent Biomonitoring Report – CHRONIC TOXICITY TEST

Permittee : Rico Development Corp. **CDPS Permit No. :** CO-0029793 **Contact :** Mike Towne
Address : #3 Soda Street, Rico, CO 81332 **Discharge point :** 002
Laboratory and person conducting test : Commercial Testing and Engineering, 490 Orchard Street Golden, CO 80401 Fred Offenkrantz
Dilution water : Reconstituted **location :** ______ **Test species :** Ceriodaphnia dubia **age :** 16-24 hours **source :** In-house
Test beginning date : 11-28-90 **time :** 1700 **Ending date :** 12-5-90 **time :** 1750
Sample type : Grab ~~Composite~~ no. 1 collected from : 0800 AM/PM 11/26/90 (date) to : ______ AM/PM __/__/__ days : 2
~~Composite~~ no. 2 collected from : 0830 AM/PM 11/29/90 to : ______ AM/PM __/__/__ days : 3
~~Composite~~ no. 3 collected from : 0830 AM/PM 11/30/90 to : ______ AM/PM __/__/__ days : 2

Test conc. & replicate	Percentage survival @ day 1	2	3	4	5	6	7	No. young produced X̄	min	max	~~Dry weight (mg)~~ Repl.	X̄	D.O. min	max	Temp. min	max	pH X̄	S.D	Alk. X̄	S.D	Hard. X̄	S.D	Cond. X̄	S.D
0% effluent	100	→	→	→	→	→	→	16.8	14	20			6.1	6.9	24.4	25.9	8.3	0.0	140		152		741	
6.25%	100	→	→	→	→	→	→	17.7	15	20			6.1	6.9	24.4	25.9	8.3	0.2						
12.5%	100	→	→	→	90	→	→	16.3	15	19			6.1	6.9	24.4	25.9	8.3	0.0						
25%	100	80	→	→	→	60	60	3.7	3	4			6.1	6.9	24.4	25.9	8.3	0.0						
46%	100	80	70	→	→	10	0	—					6.1	6.9	24.4	25.9	8.3	0.0						
100%	100	40	20	→	→	0	0	—					6.1	6.9	24.4	25.9	8.05	0.1	85		800		1243	

IWC = 46 % **Test concentrations where statistically significant effects occurred :** 25, 46 and 100% effluent **Statistical method :** Dunnett's ANOVA.

Comments :

Colorado Department Health – WQCD

CDPS Effluent Biomonitoring Report - CHRONIC TOXICITY TEST

Permittee : Rico Development Corp. CDPS Permit No. : Co-0029793 Contact : Mike Towne

Address : #3 Soda Street, Rico, Co 81332 Discharge point : 002

Laboratory and person conducting test : Commercial Testing and Engineering, 490 Orchard St, Golden, Co 80401 Fred Offenkrantz

Dilution water : Reconstituted location : Test species : Pimephales promelas age : 5 days source : in-house

Test beginning date : 11-28-90 time : 1800 Ending date : 12-5-90 time : 1800

Sample type : Grab ~~Composite~~ no. 1 collected from : ____ AM/PM __/__/__ (date) to : 0800 AM/PM 11/26/90 days : 2

~~Composite~~ no. 2 collected from : ____ AM/PM __/__/__ to : 0830 AM/PM 11/29/90 days : 3

~~Composite~~ no. 3 collected from : ____ AM/PM __/__/__ to : 0830 AM/PM 11/30/90 days : 1

Test conc. & replicate	Percentage survival @ day 1	2	3	4	5	6	7	~~No. young produced~~ X	min	max	Dry weight (mg) Repl.	X	D.O. min	D.O. max	Temp. min	Temp. max	pH X	pH S.D	Alk. X	Alk. S.D	Hard. X	Hard. S.D	Cond. X	Cond. S.D
0% effluent A	100						→				0.54		5.7	6.9	24.6	25.9	8.3	0.1	140		152		741	
B	100						→				0.57													
C	100						→				0.69	0.62												
6.25% A	100						→				0.78		5.7	6.9	24.6	25.9	8.0	0.1						
B	100						→				0.55													
C	100						→				0.66	0.66												
12.5% A	100						→				0.69		5.7	6.9	24.6	25.9	8.0	0.1						
B	100						→				0.76													
C	100	→	90				→				0.60	0.71												
25% A	100						→				0.49		5.7	6.9	24.6	25.9	8.0	0.2						
B	100	100	90				→				0.71													
C	100	100	90				→				0.84	0.73												
46% A	100						→				0.48		5.7	6.9	24.6	25.9	7.9	0.2						
B	100	100	100				→				0.71													
C	100	100	100				→				0.85	0.68												
100% A	100						→				0.94		5.7	6.9	24.6	25.9	7.9	0.1						
B	100						→				0.77													
C	100						→				0.46	0.72							85		800		1743	
																			85		800		1243	

IWC = 46 % Test concentrations where statistically significant effects occurred : None Statistical method : Dunnetts ANOVA

Comments :

Colorado Department Health - WQCD

APPENDIX B
Forms for reporting to the EPA the results of
toxicity tests completed 12-5-90 on sample 138491.

REGION VIII GUIDANCE FOR ACUTE WHOLE EFFLUENT REPORTING

PERMITTEE NAME Rico Development Corp NPDES NO CO-0029793

50% MORTALITY TEST: ___ pass X fail LC50 21 % OUTFALL NO 002

TEST ANIMAL & AGE Ceriodaphnia dubia <24 hours SAMPLE TYPE, TIME & DATE Grab 0800 11-26-90

Analysis Time & Date: Begin 1530 11-28-90 End 1530 11-30-90

Measurements	Dilutions (% Effluent)* 0%	6%	12.5%	25%	46 ~~50~~%	75%	100%
No @ Start of Test	20	20	20	20	20	—	20
No live after 24 hrs	18	16	13	12	9	—	2
No live after 48 hrs	18	15	13	9	7	—	0
No live after 72 hrs							
No live after 96 hrs							
Initial DO: mg/l	6.9	6.9	6.9	6.9	6.9	—	6.9
DO; 24 hrs: old/new	5.9/6.9	5.9/6.9	5.9/6.9	5.9/6.9	5.9/6.9	T	5.9/6.9
DO; 48 hrs: old/new	5.7/	5.7/	5.7/	5.7/	5.7/	T	5.6/
DO; 72 hrs: old/new	/	/	/	/	/	/	/
DO; 96 hrs:							
Initial temp: °C	25.1	25.1	25.1	25.1	25.1	—	25.1
Temp; 24 hrs: old/new	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	T	25.8/25.1
Temp; 48 hrs: old/new	25.9/	25.9/	25.9/	25.9/	25.9/	T	25.9
Temp; 72 hrs: old/new	/	/	/	/	/	/	/
Temp; 96 hrs:							

Hardness: Receiving Water 152 Effluent 800 Recon. Water (if used) 152

Init. Total Residual Cl_2: 100% None Detected Init. pH: cntrl 8.1 100% 7.7

Init. NH_3 as N: 100% <0.1 Final NH_3 as N: 100% <0.1

Final pH: cntrl 8.3 100% 8.2 ANALYST'S NAME Fred Offenkantz

LABORATORY Commercial Testing and Engineering Golden, CO 80401 SIGNATURE/DATE Fred Offenkantz 12-11-90

* normally, a minimum of five plus control (0%)

REGION VIII GUIDANCE FOR ACUTE WHOLE EFFLUENT REPORTING

PERMITTEE NAME Rio Development Corp. NPDES NO CO-0029793

50% MORTALITY TEST: X pass ___ fail LC50 >100 % OUTFALL NO 002

TEST ANIMAL & AGE Pimephales promelas 5 to 1 days SAMPLE TYPE, TIME & DATE Grab 0800 11-26-90

Analysis Time & Date: Begin 1615 11-28-90 End 1615 12-2-90

Measurements	Dilutions (% Effluent)* 0%	6%	12.5%	25%	46 ~~50~~%	75%	100%
No @ Start of Test	20	20	20	20	20	—	20
No live after 24 hrs	20	20	20	20	20	—	20
No live after 48 hrs	20	20	20	20	20	—	20
No live after 72 hrs	20	20	20	20	20	—	20
No live after 96 hrs	19	20	20	20	20	—	20
Initial DO: mg/l	6.9	6.9	6.9	6.9	6.9	—	6.9
DO; 24 hrs: old/new	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	〃	6.9/5.7
DO; 48 hrs: old/new	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	6.9/5.7	〃	6.9/5.7
DO; 72 hrs: old/new	6.9/5.6	6.9/5.6	6.9/5.6	6.9/5.6	6.9/5.6	〃	6.9/5.6
DO; 96 hrs:	5.7	5.7	5.7	5.7	5.7	—	5.7
Initial temp: °C	25.1	25.1	25.1	25.1	25.1	—	25.1
Temp; 24 hrs: old/new	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	25.8/25.1	〃	25.8/25.1
Temp; 48 hrs: old/new	25.9/25.1	25.9/25.1	25.9/25.1	25.9/25.1	25.9/25.1	〃	25.9/25.1
Temp; 72 hrs: old/new	25.8/25.5	25.8/25.5	25.8/25.5	25.8/25.5	25.8/25.5	〃	25.8/25.5
Temp; 96 hrs:	24.6	24.6	24.6	24.6	24.6	—	24.6

Hardness: Receiving Water 152 Effluent 800 Recon. Water (if used) 152

Init. Total Residual Cl_2: 100% None Detected Init. pH: cntrl 8.1 100% 7.7

Init. NH_3 as N: 100% <0.1 mg/L Final NH_3 as N: 100% <0.1

Final pH: cntrl 8.2 100% 8.0 ANALYST'S NAME Fred Offenkrantz

LABORATORY Commercial Testing and Engineering Golden, CO 80401 SIGNATURE/DATE Fred Offenkrantz 12-11-90

* normally, a minimum of five plus control (0%) 10/5/89

REGION VIII GUIDANCE FOR CHRONIC WHOLE EFFLUENT REPORTING
CERIODAPHNIA

PERMIT NAME Rico Development Corp. **NPDES No** CO-0029793

MEAN NO PRODUCED: CONTROL 16.8 **EFFLUENT** — **pass** ___ **fail** X **Outfall No** 002

Sample Type, Time, & Dates	Analyses: Time & Date
No 1 Grab, 0800, 11-26-90	Beginning 11-28-90 1700
No 2 Grab, 0830, 11-29-90	Ending 12-5-90 1750
No 3 Grab, 0930, 11-30-90	Initial Organism Age 16-24 hours

Control = 0% Effluent Effluent Sample = 6.25, 12.5, 25, 46 and 100% Effluent (see Permit)

Receiving Water Hardness 152 Reconstituted Water Hardness (if used) 152

CERIODAPHNIA

Total Number of Young Produced in Three Broods ("D"=dead)

Sample	Replicates A	B	C	D	E	F	G	H	I	J	K**	L**
Control	18	19	20	16	15	15	15	18	14	18		
46% Effluent	D	D	D	D	D	D	D	D	D	D		

PHYSICAL DATA - CONTROL

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1
T °C old/new	25.1	25.8/25.1	25.9/25.1	24.4/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9

PHYSICAL DATA - EFFLUENT 46%

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1/6.9	6.1
T °C old/new	25.1	25.8/25.1	25.9/25.1	24.0/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9
Hardness*	800		798			806		

* Testing Required only on days when fresh effluent is received in laboratory (normally, initially, and days 3 and 5).

ANALYST'S NAME Fred Offenkrantz

LABORATORY Commercial Testing and Engineering Golden, CO 80401 **SIGNATURE/DATE** Fred Offenkrantz 12-11-90

10/5/89

REGION VIII GUIDANCE FOR CHRONIC WHOLE EFFLUENT REPORTING
FATHEAD MINNOWS

PERMIT NAME Rico Development Corp **NPDES No** CO-0079793

FINAL MEAN WEIGHT: CONTROL 0.62mg **EFFL** 0.72mg **pass** X **fail** ___ **Outfall No** 002

Sample Type, Time, & Dates	Analyses: Time & Date
No 1 Grab, 0800, 11-26-90	Beginning 1800 11-28-90
No 2 & 3 Grab, 0830, 11-29-90	Ending 1800 12-5-90
Grab, 0830, 11-30-90	Initial Organism: Age 5 days Mean Weight ___

Control = 0% Effluent Effluent Sample = 0, 6.25, 12.5, 25, 46 and 100% Effluent (see Permit)

Receiving Water Hardness 152 Reconstituted Water Hardness (if used) 152

FATHEAD MINNOWS

	No of Organisms / Percent Survival Replicates				Mean Weight After 7 Days (milligrams) Replicates			
	A	B	C	D	A	B	C	D
Control	10/100	10/100	10/100		0.59	0.57	0.69	
46% Effluent	10/10	10/100	10/100		0.48	0.71	0.85	

PHYSICAL DATA - CONTROL

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7
T °C old/new	25.1	25.8/25.1	25.9/25.1	25.8/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9

PHYSICAL DATA - EFFLUENT (46%)

Measurement	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO old/new	6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7/6.9	5.7
T °C old/new	25.1	25.8/25.1	25.9/25.1	25.8/25.5	24.6/25.0	24.8/25.1	24.8/25.0	24.9
Hardness*	800		798			806		

* Testing Required only on days when fresh effluent is received in laboratory (normally; initially, and days 3, and 5).

ANALYST'S NAME Fred Offenkrantz

LABORATORY Commercial Testing and Engineering Golden CO 80401 **SIGNATURE/DATE** Fred Offenkrantz 12-11-90

10/5/89

APPENDIX C
Statistical analyses applied to results of acute toxicity tests completed 12-2-90 on sample 138491.

'rogram run on 12-10-1990 at 10:49:25

:ESULTS CALCULATED USING THE BINOMINAL METHOD

:ONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	20	18	90.00	0.0201
46	20	13	65.00	13.1588
25	20	11	55.00	41.1901
12	20	7	35.00	13.1588
6	20	5	25.00	2.0695

'HE BINOMIAL TEST SHOWS THAT 6 AND 100 CAN BE
SED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
'ONFIDENCE LIMITS BECAUSE THE ACTUAL CONFIDENCE LEVEL
.SSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT

.N APPROXIMATE LC50 OF 20.84509 IS OBTAINED BY
ONLINEAR INTERPOLATION BETWEEN 12 AND 25

.ESULTS CALCULATED USING THE MOVING AVERAGE METHOD

PAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	0.264	21.127	12.252	33.318
3	0.574	21.999	11.371	81.524
2	1.113	21.699	0.0	+INFINITY
1	2.521	20.845	0.0	+INFINITY

N LC50 CALCULATED USING THE MOVING AVERAGE METHOD MAY NOT
E A VERY GOOD ESTIMATE IF THE SPAN IS MUCH LESS THAN THE
UMBER OF CONCENTRATIONS.

ESULTS CALCULATED USING THE PROBIT METHOD

TERATIONS	G	H	CHI-SQUARE	GOODNESS OF FIT PROBABILITY
3	0.191	1.000	0.834	0.841

LOPE = 1.504177
5 PERCENT CONFIDENCE LIMITS = .8475263 AND 2.160827

C50 = 19.92978
5 PERCENT CONFIDENCE LIMITS = 12.22069 AND 30.45126

C1 = .5661641
5 PERCENT CONFIDENCE LIMITS = 3.064237E-02 AND 1.832267

OMPARE RESULTS WITH ORIGINAL DATA TO SEE IF THEY ARE
EASONABLE.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	18	2	20
6	15	5	20
TOTAL	33	7	40

CRITICAL FISHERS VALUE (20,20,18) (p=0.05) IS 12. b VALUE IS 15.
Since b is greater than 12 there is no significant difference
etween CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	18	2	20
12	13	7	20
TOTAL	31	9	40

CRITICAL FISHERS VALUE (20,20,18) (p=0.05) IS 12. b VALUE IS 13.
Since b is greater than 12 there is no significant difference
etween CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	18	2	20
25	9	11	20
TOTAL	27	13	40

CRITICAL FISHERS VALUE (20,20,18) (p=0.05) IS 12. b VALUE IS 9.
Since b is less than or equal to 12 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	18	2	20
46	7	13	20
TOTAL	25	15	40

CRITICAL FISHERS VALUE (20,20,18) (p=0.05) IS 12. b VALUE IS 7.
Since b is less than or equal to 12 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	18	2	20
100	2	18	20
TOTAL	20	20	40

CRITICAL FISHERS VALUE (20,20,18) (p=0.05) IS 12. b VALUE IS 2.
Since b is less than or equal to 12 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

ROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	20	2	
1	6	20	5	
2	12	20	7	
3	25	20	11	*
4	46	20	13	*
5	100	20	18	*

(ico 12-90 FHA
'rogram run on 12-10-1990 at 10:53:08

(ESULTS CALCULATED USING THE BINOMINAL METHOD

:ONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	20	0	0.00	LESS THAN 0.001
46	20	0	0.00	LESS THAN 0.001
25	20	0	0.00	LESS THAN 0.001
12	20	0	0.00	LESS THAN 0.001
6	20	0	0.00	LESS THAN 0.001

,T A CONFIDENCE LEVEL OF 95 PERCENT, THE BINOMIAL TEST
;HOWS THAT THE LC50 IS ABOVE 100

'O METHOD CAN CALCULATE AN LC50 IF THE PERCENT DEAD
S THE SAME AT ALL TESTED CONCENTRATIONS.

'OMPARE RESULTS WITH ORIGINAL DATA TO SEE IF THEY ARE
(EASONABLE.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	1	19	20
6	0	20	20
TOTAL	1	39	40

CRITICAL FISHERS VALUE (20,20,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	1	19	20
12	0	20	20
TOTAL	1	39	40

CRITICAL FISHERS VALUE (20,20,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	1	19	20
25	0	20	20
TOTAL	1	39	40

CRITICAL FISHERS VALUE (20,20,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	1	19	20
46	0	20	20
TOTAL	1	39	40

CRITICAL FISHERS VALUE (20,20,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	1	19	20
100	0	20	20
TOTAL	1	39	40

CRITICAL FISHERS VALUE (20,20,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

SUMMARY OF FISHERS EXACT TESTS

ROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	20	1	
1	6	20	0	
2	12	20	0	
3	25	20	0	
4	46	20	0	
5	100	20	0	

APPENDIX D

Statistical analyses applied to results of chronic toxicity tests completed 12-2-90 on sample 138491.

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

hi-square test for normality: actual and expected frequencies

NTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
XPECTED	2.345	8.470	13.370	8.470	2.345
BSERVED	1	11	8	13	2

alculated Chi-Square goodness of fit test statistic = 6.1575
able Chi-Square value (alpha = 0.01) = 13.277

ata PASS normality test. Continue analysis.

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

hapiro Wilks test for normality

= 77.033

= 0.961

ritical W (P = 0.05) (n = 35) = 0.934
ritical W (P = 0.01) (n = 35) = 0.910

ata PASS normality test at P=0.01 level. Continue analysis.

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

artley test for homogeneity of variance

alculated H statistic (max Var/min Var) = 15.67
losest, conservative, Table H statistic = 11.7 (alpha = 0.01)

sed for Table H ==> R (# groups) = 4, df (# reps-1) = 8
ctual values ==> R (# groups) = 4, df (# avg reps-1) = 7.75
(average df used)

ata FAIL homogeneity test. Try another transformation.

OTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used

as an approximate test (average df are used).

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

artletts test for homogeneity of variance

---

alculated B statistic = 11.28
able Chi-square value = 11.34 (alpha = 0.01)
able Chi-square value = 7.81 (alpha = 0.05)

verage df used in calculation ==> df (avg n - 1) = 7.75
sed for Chi-square table value ==> df (#groups-1) = 3

---

ata PASS homogeneity test at 0.01 level. Continue analysis.

OTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

'ITLE: Rico 12-90 CDC
'ILE: Rico 12-90 CDC
'RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 4

RP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	0	1	18.0000	18.0000
1	0	2	19.0000	19.0000
1	0	3	20.0000	20.0000
1	0	4	16.0000	16.0000
1	0	5	15.0000	15.0000
1	0	6	15.0000	15.0000
1	0	7	15.0000	15.0000
1	0	8	18.0000	18.0000
1	0	9	14.0000	14.0000
1	0	10	18.0000	18.0000
2	6	1	18.0000	18.0000
2	6	2	20.0000	20.0000
2	6	3	18.0000	18.0000
2	6	4	16.0000	16.0000
2	6	5	18.0000	18.0000
2	6	6	18.0000	18.0000
2	6	7	20.0000	20.0000
2	6	8	18.0000	18.0000
2	6	9	16.0000	16.0000
2	6	10	15.0000	15.0000
3	12	1	15.0000	15.0000
3	12	2	16.0000	16.0000
3	12	3	17.0000	17.0000
3	12	4	16.0000	16.0000
3	12	5	17.0000	17.0000
3	12	6	15.0000	15.0000
3	12	7	19.0000	19.0000
3	12	8	15.0000	15.0000
3	12	9	17.0000	17.0000
4	25	1	4.0000	4.0000
4	25	2	3.0000	3.0000
4	25	3	4.0000	4.0000
4	25	4	3.0000	3.0000
4	25	5	4.0000	4.0000
4	25	6	4.0000	4.0000

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

RP	IDENTIFICATION	N	MIN	MAX	MEAN
1	0	10	14.000	20.000	16.800
2	6	10	15.000	20.000	17.700
3	12	9	15.000	19.000	16.333

4.	25	6	3.000	4.000	3.667

Rico 12-90 CDC
'ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

RP	IDENTIFICATION	VARIANCE	SD	SEM
1	0	4.178	2.044	0.646
2	6	2.678	1.636	0.517
3	12	1.750	1.323	0.441
4	25	0.267	0.516	0.211

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

ANOVA TABLE

OURCE	DF	SS	MS	F
etween	3	888.510	296.170	119.183
ithin (Error)	31	77.033	2.485	
otal	34	965.543		

Critical F value = 2.92 (0.05,3,30)
Since F > Critical F REJECT Ho:All groups equal

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

DUNNETTS TEST

****** WARNING ******

This data set has unequal replicates. The Bonferroni T-test should be used instead of the Dunnetts test.

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control=Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	0	16.800	16.800		
2	6	17.700	17.700	-1.277	
3	12	16.333	16.333	0.644	
4	25	3.667	3.667	16.133	*

unnett table value = 2.47 (2 Tailed Value, P=0.05, df=22,3)

Rico 12-90 CDC
ile: Rico 12-90 CDC Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control=Treatment

ROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	0	10			
2	6	10	1.741	10.4	-0.900
3	12	9	1.789	10.6	0.467
4	25	6	2.011	12.0	13.133

Rico 12-90 FHC
File: Rico 12-90 FHC Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.206	4.356	6.876	4.356	1.206
OBSERVED	0	6	6	6	0

Calculated Chi-Square goodness of fit test statistic = 3.7645
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

Rico 12-90 FHC
File: Rico 12-90 FHC Transform: NO TRANSFORMATION

Shapiro Wilks test for normality

= 0.298

= 0.973

Critical W (P = 0.05) (n = 18) = 0.897
Critical W (P = 0.01) (n = 18) = 0.858

Data PASS normality test at P=0.01 level. Continue analysis.

Rico 12-90 FHC

'ile: Rico 12-90 FHC Transform: NO TRANSFORMATION

lartley test for homogeneity of variance

'alculated H statistic (max Var/min Var) = 14.33
'losest, conservative, Table H statistic = 1362.0 (alpha = 0.01)

lsed for Table H ==> R (# groups) = 6, df (# reps-1) = 2
ıctual values ==> R (# groups) = 6, df (# avg reps-1) = 2.00

'ata PASS homogeneity test. Continue analysis.

'OTE: This test requires equal replicate sizes. If they are unequal
but do not differ greatly, the Hartley test may still be used
as an approximate test (average df are used).

.ico 12-90 FHC
ile: Rico 12-90 FHC Transform: NO TRANSFORMATION

artletts test for homogeneity of variance

---

alculated B statistic = 3.92
able Chi-square value = 15.09 (alpha = 0.01)
able Chi-square value = 11.07 (alpha = 0.05)

verage df used in calculation ==> df (avg n - 1) = 2.00
sed for Chi-square table value ==> df (#groups-1) = 5

---

ata PASS homogeneity test at 0.01 level. Continue analysis.

OTE: If groups have unequal replicate sizes the average replicate size is
used to calculate the B statistic (see above).

TITLE: Rico 12-90 FHC
FILE: Rico 12-90 FHC
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	0	1	0.5900	0.5900
1	0	2	0.5700	0.5700
1	0	3	0.6900	0.6900
2	6	1	0.7800	0.7800
2	6	2	0.5500	0.5500
2	6	3	0.6600	0.6600
3	12	1	0.6900	0.6900
3	12	2	0.7600	0.7600
3	12	3	0.6000	0.6000
4	25	1	0.4900	0.4900
4	25	2	0.7100	0.7100
4	25	3	0.8400	0.8400
5	46	1	0.4800	0.4800
5	46	2	0.7100	0.7100
5	46	3	0.8500	0.8500
6	100	1	0.9400	0.9400
6	100	2	0.7700	0.7700
6	100	3	0.4600	0.4600

ico 12-90 FHC
ile: Rico 12-90 FHC Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

RP	IDENTIFICATION	N	MIN	MAX	MEAN
1	0	3	0.570	0.690	0.617
2	6	3	0.550	0.780	0.663
3	12	3	0.600	0.760	0.683
4	25	3	0.490	0.840	0.680
5	46	3	0.480	0.850	0.680
6	100	3	0.460	0.940	0.723

Rico 12-90 FHC
File: Rico 12-90 FHC Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	0	0.004	0.064	0.037
2	6	0.013	0.115	0.066
3	12	0.006	0.080	0.046
4	25	0.031	0.177	0.102
5	46	0.035	0.187	0.108
6	100	0.059	0.243	0.141

Rico 12-90 FHC
File: Rico 12-90 FHC Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.018	0.004	0.160
Within (Error)	12	0.298	0.025	
Total	17	0.316		

Critical F value = 3.11 (0.05,5,12)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

Rico 12-90 FHC
File: Rico 12-90 FHC Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control=Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	0	0.617	0.617		
2	6	0.663	0.663	-0.361	
3	12	0.683	0.683	-0.516	
4	25	0.680	0.680	-0.491	
5	46	0.680	0.680	-0.491	
6	100	0.723	0.723	-0.826	

Dunnett table value = 2.90 (2 Tailed Value, P=0.05, df=12,5)

ico 12-90 FHC
ile: Rico 12-90 FHC Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control=Treatment

ROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	0	3			
2	6	3	0.374	60.7	-0.047
3	12	3	0.374	60.7	-0.067
4	25	3	0.374	60.7	-0.063
5	46	3	0.374	60.7	-0.063
6	100	3	0.374	60.7	-0.107

COLORADO
DEPARTMENT
OF HEALTH

4210 East 11th Avenue
Denver, Colorado 80220-3716
Phone (303) 320-8333

Telefax Numbers:
Main Building/Denver
(303) 322-9076

Ptarmigan Place/Denver
(303) 320-1529

First National Bank Building/Denver
(303) 355-6559

Grand Junction Office
(303) 248-7198

Pueblo Office
(719) 543-8441

ROY ROMER
Governor

JOEL KOHN
Interim Executive Director

August 20, 1991

Rico Development Corp
David Sell
McMichael, Bender and Multz
1580 Lincoln Street, Suite 900
Denver, CO 80203

CERTIFIED MAIL NO: P 330 075 404

RE: Amended Permit, Colorado Wastewater Discharge Permit System
Number: CO- 0029793 - RICO DEVELOPMENT CORP.

Gentlemen:

Enclosed please find a copy of the amended pages of your existing permit which was issued under the Colorado Water Quality Control Act.

Your discharge permit requires that specific actions be performed at designated times. You are legally obligated to comply with all terms and conditions of your permit including these changes. It is especially important to note the "EFFECTIVE DATE", not the "AMENDED" date, located at the bottom of each amended page of your permit. It is illegal to discharge per the new conditions until the effective date.

Please read the amended pages of the permit and if you have any questions contact this office at 331-4590.

Sincerely,

Robert J. Shukle

Robert J. Shukle, Chief
Permits and Enforcement Section
Water Quality Control Division

cc: Permits Section, Environmental Protection Agency
Regional Council of Government
Local County Health Department
District Engineer, Field Support Section, WQCD
Stan May, Field Support Section, WQCD
Ginny Torrez, Permits and Enforcement Section, WQCD
Anne Ihlenfeldt, Permits and Enforcement Section, WQCD
Permit Drafters, Permits and Enforcement Section, WQCD

RJS/lg

Enclosure

COLORADO DEPARTMENT OF HEALTH
Water Quality Control Division
4210 East 11th Avenue
Denver, Colorado 80220

AMENDMENT NO. 2

RATIONALE

RICO DEVELOPMENT CORP.
ST. LOUIS TUNNEL MINE

PERMIT NUMBER CO-0029793, DOLORES COUNTY

I. TYPE OF PERMIT: Second Amendment, Industrial

II. FACILITY INFORMATION:

A. Facility Type and Fee Category: Category 3, Subcategory 3 - Hardrock Mining: Mine Dewatering from 1,000,000 gallons per day or over.
Current fee is $1519/year per C.R.S. 25-8-502

B. SIC No.: 1031 and 1044

C. Legal Contact: Rico Development Corp.
c/o McMichael, Bender and Multz
Attn: David Sell
1580 Lincoln Street
Suite 900
Denver, CO 80203
(303)+837-1580

D. Facility Contact: Wayne E. Webster, Site Manager
Burley Building
P.O. Box 130
Rico, CO 80524
(303)+967-2152 or 967-2793

E. Facility Location: In Section 24 and Section 25; Township 40 North; Range 11 West.

F. Discharge Point: 001 is used only as an emergency bypass to Silver Creek from the Blaine Tunnel. There is essentially zero discharge from this point, because the water is normally redirected underground.
002 is the discharge point for stormwater runoff, water from an artesian well and treated mine drainage water. See Figure 2 in the permit.

III. RECEIVING STREAM:

A. Identification, Classification and Standards

1. Identification: Discharge point 002 discharges to the Dolores River and disharge point 001 discharges to Silver Creek, which is tributary to the Dolores River. The Segment for the Dolores River is 2 in the Dolores River Basin, and the Segment for Silver Creek is 9 in the Dolores River Basin.

2. Classification: The stream segment of the Dolores River is classified for the following uses: Recreation, Class 2; Aquatic Life, Class 1 (Cold); Agricultural and Water Supply. The stream segment of Silver Creek is classified for the following uses: Use Protected; Recreation, Class 2; Aquatic Life, Class 2 (Cold); Agricultural.

3. Numeric Standards: The standards which have been assigned in accordance with the above classifications can be found in 3.4.0 Classifications and Numeric Stanards for the San Juan and Dolores River Basins (5 CCR 1002-8).

The standards which are impacted by this discharge are:

Dolores River

Physical and Biological

D. O. = 6.0 mg/l and 7.0 mg/l spawning
pH = 6.5 - 9.0 mg/l

Metals

Cadmium (ch)	= 0.4 ug/l	Copper (ch)	= 14 ug/l
Lead (ch)	= 4.0 ug/l	Mercury (ch)	= 0.05 ug/l:
Silver (ch)	= 0.1 ug/l	Zinc (ch)	= 240 ug/l

Silver Creek

Physical and Biological

D. O. = 6.0 mg/l and 7.0 mg/l spawning
pH = 6.5 - 9.0 mg/l

Metals

Cadmium (ch)	= 6.0 ug/l	Copper (ch)	= 20 ug/l
Lead (ch)	= 16 ug/l	Mercury (ch)	= 0.05 ug/l:
Silver (ch)	= 0.1 ug/l	Zinc (ch)	= 1,400 ug/l

IV. PURPOSE OF AMENDMENT:

The purpose of the amendment is to assess the need for both species of test animals in the Whole Effluent Toxicity (WET) testing. The permittee submitted a letter dated April 29, 1991. The letter requested that the permittee be excused from using the fathead minnow in the Chronic WET test based upon it being the least sensitive of the two species. The letter referenced Amendment #1 's Rationale and Permit to support their request. The Rationale reference is Page 3 and the last paragraph on the page. The permit reference is Page 1c (v) of 19 Section 10 (dated August 29, 1989).

V. DISCUSSION OF THE AMENDMENT

The Division has reviewed the file data pertaining to the WET tests performed as part of this permit. The results indicate that there has been little, if any, toxicity indicated by the fathead minnow during one year's data. The Ceriodaphnia has had mortality rates greater than 50% during the same sampling period. The permittee is investigating various reasons for the unacceptable mortality rate of the Ceriodaphnia. Therefore, the chronic WET test shall continue until June 30, 1992, unless applicable regulations are developed which require inclusion of a chronic toxicity limit in the permit.

The permittee's request is consistent with 6.9.7 (5) (b), which states that "...After the first year, the monitoring requirements will require testing with only the more sensitive species...". The Division has determined that the WET testing shall be performed with only the Ceriodaphnia sp., based upon the fact that this species is the more sensitive of the two.

MICHAEL J. LIUZZI
July 2, 1991

Permit No.: CO-0029793

County: Dolores

AUTHORIZATION TO DISCHARGE UNDER THE

COLORADO DISCHARGE PERMIT SYSTEM

In compliance with the provisions of the Colorado Water Quality Control Act, (25-8-101 et. seq., CRS, 1973 as amended) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et. seq.; the "Act") the

RICO DEVELOPMENT CORPORATION, A COLORADO CORPORATION

is authorized to discharge from the St. Louis tunnel treatment system

located in Sec. 24 and 25, T40N, R11W

to the Dolores River and Silver Creek

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Part I, and II hereof. All discharges authorized herein shall be consistent with the terms and conditions of this permit.

This permit shall become effective thirty (30) days after the date signed by the Director. Should the applicant choose to contest any of the effluent limitations, monitoring requirements or other conditions contained herein, the applicant must comply with Section 24-4-104 CRS 1973 and the Regulations for the State Discharge Permit System. Failure to contest any such effluent limitation, monitoring requirement, or other condition, constitutes consent to the condition by the Applicant.

This permit and the authorization to discharge shall expire at midnight,

December 31, 1992.

Issued and Signed this 13 day of May, 1988

COLORADO DEPARTMENT OF HEALTH

Paul Ferraro, Director
Water Quality Control Division

CERTIFIED LETTER NO.
DATE SIGNED
EFFECTIVE DATE OF
PERMIT

Code: i - 1 Date: 1 - 84

Modified 09/07/88
Amended 8/29/87
Amended 08/20/91

B. MONITORING REQUIREMENTS

9. Toxicity Incident Closure (Continued)

or if WET disappears and Division required accelerated testing demonstrate the continued absence of toxicity, the toxicity incident shall be considered closed.

If the permittee completes all required phases of the toxicity incident response specified in compliance schedules, and is unable either to identify the causative toxicants and their sources or to identify feasible treatment options, the permittee may petition the Division for relief from further investigation and testing, consistent with the permit regulations.

10. Frequency and Sample Type - Chronic WET Testing

The monitoring frequency for chronic toxicity tests shall be once every six months on a January - June, July - December sequence, and cannot coincide with acute testing. The first such test must be completed and reported on the December DMR due January. Chronic tests will be static replacement tests using three composite effluent samples, each of which is to be composited for a minimum of eight hours. Chronic testing will be conducted with Ceriodaphnia sp. The results shall be submitted on the Chronic Toxicity Test report form, available from the Division. Copies of these reports are to be submitted to both the Division and EPA.

After June 30, 1992, the chronic testing requirements will no longer be required unless applicable regulations require inclusion of a chronic toxicity limit.

The permittee shall conduct each chronic toxicity test in general accordance with methods described in the Division guidance document entitled Guidelines for Conducting Whole Effluent Toxicity Tests.

As general information, chronic toxicity occurs when there is a statistically significant difference in survival, growth or reproduction for the Ceriodaphnia species.

COLORADO
DEPARTMENT
OF▲HEALTH

4210 East 11th Avenue
Denver, Colorado 80220-3716
Phone (303) 320-8333

Telefax Numbers:
Main Building/Denver
(303) 322-9076

Ptarmigan Place/Denver
(303) 320-1529

First National Bank Building/Denver
(303) 355-6559

Grand Junction Office
(303) 248-7198

Pueblo Office
(719) 543-8441

ROY ROMER
Governor

JOEL KOHN
Interim Executive Director

August 27, 1991

Rico Development Corporation
P.O. Box 130
Rico, CO 81332

Attention: David L. Sell

RE: CDPS Permit No. CO-0029793

Enclosed is a supply of pre-printed and dated Discharge Monitoring Report forms (EPA Form 3320-1).

These forms are for your recently amended permit, effective 8-20-91 and are specific for outfall(s) 002X only.
Any other forms of the same monitoring period should be discarded for 002X.
It is imperative that these forms are completed accurately, completely, and legibly. ALL BLANKS ON THE FORM MUST BE FILLED IN. Incomplete forms will be returned.

Mail the original to:	Mail a copy to:
Colorado Department of Health Water Quality Control Division Permits & Enforcement Section 4210 East 11th Avenue Denver, CO 80220	U.S. Environmental Protection Agency Water Management Division Compliance Branch 8WM-C Denver Place, Suite 500 999 18th Street Denver, CO 80202-2405

Retain a copy for your records, in accordance with the requirements in your permit.

Please verify your DMRs against the limitations and monitoring requirements in your permit. Should you find any discrepancies, contact Pat Nelson at 331-4755. For assistance on completing the forms, contact Anne Ihlenfeldt at 331-4538.

xc: MS-3 File
Sue Cummings, WQCD

McMICHAEL, BENEDICT & MULTZ
PARTNERSHIP INCLUDING A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1560 LINCOLN STREET
SUITE 900
DENVER, COLORADO 80203

FRED-278-4521
LEASE -
SHANNONS -
5 TESTS -
D.A. -

6R. THUR
TUE 27 AUG
1 3 SEPT

Mr. Wayne Webster
Rico Development
P.O. Box 130
Rico, CO 81332

August 20, 1991

Rico Development Corporation
c/o Attn: David L. Sell
Page 2

It is important to understand that a minimum of two and a maximum of five tests are all that are required by this accelerated testing requirement. Upon completion of the accelerated testing, the Division is to be notified verbally within 24 hours and in writing within five days of the permittee becoming aware of the results. A copy of the results are to accompany the written report.

Should there be any questions please contact Anne Ihlenfeldt at 331-4538.

Sincerely,

Anne Ihlenfeldt

Anne Ihlenfeldt
Public Health Engineer
Permits and Enforcement Section
WATER QUALITY CONTROL DIVISION

PAT NELSON

xc: Carol Campbell, Environmental Protection
Jim Horn, D.E., Field Support Section

AI/dc

350

COLORADO
DEPARTMENT
OF HEALTH

4210 East 11th Avenue
Denver, Colorado 80220-3716
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ROY ROMER
Governor

JOEL KOHN
Interim Executive Director

August 20, 1991

Rico Development Corporation
c/o Attn: David L. Sell
McMichael, Benedict & Multz
1580 Lincoln Street, Suite 900
Denver, CO 80203

RE: Acute Whole Effluent Toxicity (WET)
Permit No: CO-0029793
Dolores County

Dear Mr. Sell:

Your routine acute WET test for the period of 1st quarter (January 1 through March 31, 1991) and 2nd quarter (April 1 through April 30, 1991) showed an unacceptable level of toxicity in the effluent. The species demonstrating the greatest sensitivity was Ceriodaphnia. At this time you are directed to begin accelerated testing with Ceriodaphnia. Accelerated testing is to be conducted once every week until one of the following occurs:

1) Two consecutive tests (not including the scheduled quarterly test which triggered the search for a pattern of toxicity) result in a demonstration of acute toxicity at or below the IWC, or greater than 50% mortality in any effluent concentration. This constitutes a pattern of toxicity.

2) Two consecutive tests (not including the scheduled quarterly test which triggered the search for a pattern of toxicity) do not result in a demonstration of acute toxicity at or below the IWC, or greater than 50% mortality in any effluent concentration. If this occurs, no further accelerated testing is required and no pattern of toxicity has been demonstrated.

3) If two consecutive tests yield different results, the permittee shall be required to conduct a maximum of five acute tests (not including the scheduled quarterly test which triggered the search for a pattern of toxicity). If three out of five tests results demonstrate acute toxicity at or below the IWC, or greater than 50% mortality in any effluent concentration, this will constitute a pattern of toxicity.

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300
SINCE 1908
Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
490 ORCHARD ST., GOLDEN, CO 80401
TELEPHONE: (303) 278-9521
FAX: (303) 278-1779

PRICE LIST
AQUATIC TOXICITY TESTING

ACUTE TESTS	Price
Single Specie	
One concentration:	
48-hour daphnid (Ceriodaphnia dubia)	$150
96-hour Fathead minnow (Pimephales promelas)	$200
Three concentrations (i.e. Toxicity Scan):	
48-hour daphnid	$250
96-hour Fathead minnow	$300
Five concentrations:	
48-hour daphnid	$350
96-hour Fathead minnow	$450
Two Species	
One or two concentrations:	$300
Three concentrations (i.e. Toxicity Scan):	$350
Five concentrations:	$650

CHRONIC TESTS	
Single Specie	
One concentration:	$500
Two to five concentrations:	$600
Two Species	
One concentration:	$950
Two to five concentrations:	$1175

Prices will be discounted when more than one test is ordered.

Because biomonitoring requirements in EPA permits vary, Commercial Testing and Engineering should be supplied with a copy of the permit.

Commercial Testing and Engineering provides a sampling kit including complete instructions for collecting and shipping samples, or will conduct sampling for the client at a reasonable surcharge. For more information please contact **Fred Offenkrantz**, Director, Biomonitoring Laboratory.

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
490 ORCHARD ST., GOLDEN, CO 80401
TELEPHONE: (303) 278-9521
FAX: (303) 278-1779

August 7, 1990

Dave Sell
1580 Lincoln, Suite 900
Denver, CO 80203

Mr. Sell:

I was glad for the chance to talk with you today about the biomonitoring required in Rico's permit to discharge wastewater.

I've enclosed Commercial Testing and Engineering's brochure and a list of our biomonitoring prices which, you will find, are very competitive. Please forward the extra set of these materials to Mr. Webster along with the enclosed copy of this letter.

Acting with the approval of Mike Towne, because this laboratory was not yet operational, I subcontracted the bioassays completed June 30 and July 6. For this reason, they cost $2100 instead of the $1825 I would normally charge.

Beginning this quarter you need only run a chronic test, using only one concentration of effluent, that will cost $950 per quarter (as shown on the enclosed price list).

Judging from the results of the chronic test concluded July 6, Rico's effluent should pass the bioassay required during each of the next four quarters. Once this has occurred you may petition the state of Colorado for a reduction in the frequency of testing from quarterly to biannually.

Don't hesitate to call me with any questions you might have, and feel free to visit our lab at any time.

Sincerely,

Director, Biomonitoring Laboratory

cc: Mike Towne

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
490 ORCHARD ST., GOLDEN, CO 80401
TELEPHONE: (303) 278-9521
FAX: (303) 278-1779

August 7, 1990

Mike Towne
Rico Development Corp.
#3 Soda Street
Rico, CO 81332

Mike:

Hello. Dave Sell called to inquire about the most recent biomonitoring bill from me, and I spoke with him and sent him this letter. Thought you'd like a copy.

Sincerely,

Fred Offenkrantz
Director, Biomonitoring Laboratory

Richard
Gardella
728-4222

BOB.
OMC COX NOL
331-4578
FCEA

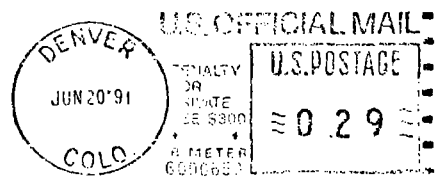
MICHAEL
LEVZZI
331-4561
DENVER

EPA

United States
Environmental Protection
Agency

8WM-C

Region 8
999 18th St., Suite 500
Denver, CO 80202-2405



Official Business
Penalty for Private Use
$300

Mr. Wayne E. Webster
Rico Development of Corporation
P.O. Box 158
Highway 145
Rico, Colorado 81332

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

JUN 20 1991

Ref: 8WM-C

FRED OFFENHRANTZ

Mr. Wayne E. Webster
Rico Development of Corporation
P.O. Box 158
Highway 145
Rico, Colorado 81332

Re: Toxicity Reduction Evaluation (TRE)
CO-0029793

Dear Mr. Webster:

Your NPDES permit requires you to perform Whole Effluent Toxicity Testing and to submit this data on a quarterly basis. It further states, "If acute toxicity occurs in a routine test, an additional test shall be conducted within four weeks of the date of the initial sample." If toxicity occurs in the second test, testing shall occur once a month until further notified by permit issuing authority.

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration. A review of your file shows for the quarters October through December '90 and January through March '91 significant mortality was observed for Ceriodaphnia.

You are hereby directed, as provided for in condition I.C.4 of your permit to perform a Toxicity Reduction Evaluation (TRE) to determine the cause of the toxicity, and/or provide treatment for the toxicity prior to the deadline for compliance contained in condition I.C.2.

Should you have any questions, please contact Bob Burm of this office at (303) 293-1587.

Sincerely,

Michael Reed, P.E., Chief
Compliance Assurance Section
Compliance Branch
Water Management Division

cc: Colorado Department of Health

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
JUN 20 1991 DENVER, COLORADO 80202-2405

Ref: 8WM-C

Mr. Wayne E. Webster
Rico Development of Corporation
P.O. Box 158
Highway 145
Rico, Colorado 81332

Re: Toxicity Reduction Evaluation (TRE)
CO-0029793

Dear Mr. Webster:

Your NPDES permit requires you to perform Whole Effluent Toxicity Testing and to submit this data on a quarterly basis. It further states, "If acute toxicity occurs in a routine test, an additional test shall be conducted within four weeks of the date of the initial sample." If toxicity occurs in the second test, testing shall occur once a month until further notified by permit issuing authority.

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Should you have any questions, please contact Bob Burm of this office at (303) 293-1587.

Sincerely,

Michael Reed, P.E., Chief
Compliance Assurance Section
Compliance Branch
Water Management Division

cc: Colorado Department of Health